

sented by Mr. A. H. Jamrach; a Horsfield's Tortoise (*Testudo horsfieldi*) from Afghanistan, presented by Capt. Cotton; two Smooth Snakes (*Coronella levis*), British, presented respectively by Mr. W. Penny and Mr. Thos. J. Mann; two Yellow-headed Troupials (*Xanthocephalus icterocephalus*) from Mexico, presented by Mr. W. A. Conklin; a Jaguar (*Felis onça*) from Bolivia, two Common Boas (*Boa constrictor*) from Savanilla, deposited; a Ring-tailed Lemur (*Lemur catta*) from Madagascar, a Ludio Monkey (*Cercopithecus ludio*), a Mona Monkey (*Cercopithecus mona*), two Rus's Weaver Birds (*Quelea russi*), two Cinereous Waxbills (*Estrela carulescens*), two Crimson-eared Waxbills (*Estrela phœnicotis*) from West Africa, a Black-footed Penguin (*Spheniscus demersus*), a Levaillant's Parrot (*Psephenus robustus*), from South Africa, a Brahminy Kite (*Haliastur indus*) from South Asia, a Brown Crane (*Grus canadensis*) from North America, a Double-crested Pigeon (*Lopholamachus antarcticus*) from North Australia, two Swift Parakeets (*Lathamus discolor*) from Tasmania, two Victoria Crowned Pigeons (*Goura victoria*) from the Island of Jobie, four Bengal Weaver Birds (*Ploceus bengalensis*) from India, a Red Lory (*Eos rubra*), an Ornamental Lorikeet (*Trichoglossus ornatus*) from Moluccas, a White-billed Parrakeet (*Tanygnathus albirostris*) from Celebes, a Noble Macaw (*Ara nobilis*) from Brazil, two Yellow-fronted Amazons (*Chrysotis ochrocephala*) from Panama, a White headed Parrot (*Pionus senilis*) from Mexico, two Black-headed Conures (*Conurus nanday*) from Paraguay, two Silky Marmosets (*Midas rosalia*) from South-East Brazil, a Leucoryx Antelope (*Oryx leucoryx*) from North Africa, a Common Otter (*Lutra vulgaris*), British, three Chinchillas (*Chinchilla lanigera*) from Chili, an Upland Goose (*Bernicla magellanica*) from the Falkland Islands, three Ashy-headed Geese (*Bernicla polioccephala*) from South America, purchased; an Anoa (*Anoa depressicornis*) from Celebes, received in exchange; an Axis Deer (*Cervus axis*), a Japanese Deer (*Cervus sika*), a Geoffroy's Dove (*Peristera geoffroyi*), a Wongawonga Pigeon (*Leucosarcia picata*), a Turquoise Parrakeet (*Euphema pulchella*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

FAYE'S COMET.—Dr. Axel-Möller commences his ephemeris of Faye's comet for the present year on July 1, when its distance from the earth will be 2'005, and that from the sun 2'53; the perihelion passage will not take place till January 22, 1881. The intensity of light corresponding to the comet's distances on July 1 is 0'039; in 1844 it was observed with sensibly the same intensity, the value for the last observation with the 15-inch refractor at Pulkowa being 0'035. The comet attains its greatest brightness in the middle of October, when the value corresponds to that at the last observation in 1858, with the 9'6-inch refractor at Berlin on October 16. At discovery by M. Faye in 1843 the theoretical intensity of light was 0'54, which has not been approached at any of the subsequent returns. The following positions are taken from Dr. Axel-Möller's ephemeris, which is calculated for Berlin midnight, or about 11h. G.M.T. :—

	Right Ascension. h. m. s.	Declina- tion. h. m. s.		Right Ascension. h. m. s.	Declina- tion. h. m. s.
July 1 ...	23 5 25 ...	+ 7 53'5	July 17 ...	23 13 17 ...	+ 9 34'5
3 ...	23 6 38 ...	8 7'7	19 ...	23 13 57 ...	9 44'8
5 ...	23 7 47 ...	8 21'4	21 ...	23 14 32 ...	9 54'6
7 ...	23 8 52 ...	8 34'8	23 ...	23 15 2 ...	10 3'6
9 ...	23 9 54 ...	8 47'7	25 ...	23 15 27 ...	10 12'0
11 ...	23 10 51 ...	9 0'1	27 ...	23 15 47 ...	10 19'7
13 ...	23 11 44 ...	9 12'1	29 ...	23 16 2 ...	10 26'6
15 ...	23 12 33 ...	+ 9 23'6	31 ...	23 16 12 ...	+ 10 32'8

The comet will arrive at its least distance from the earth (1'09) on October 3. So far as can be foreseen without calculation of the perturbations the comet is not likely to exhibit a degree of brightness approaching that in the year of its discovery by M. Faye, until 1903.

While Faye's comet is followed up by Dr. Axel-Möller in the same admirable manner as for many years past, calculations relating to other comets of short period are in the hands of the

following astronomers according to the last Report of the *Astronomisches Gesellschaft*:—Dr. Backlund of the Imperial Observatory, Pulkowa, proceeds with the perturbations of Encke's comet, taking up the work where it was left by the late Dr. v. Asten; Brorsen's comet is undertaken by Prof. R. Schulze of Döbeln; D'Arrest's by M. Leveau of Paris; Winnecke's by Prof. Oppolzer of Vienna; Tempel's comet of 1867 by M. Gautier of Geneva; Tempel's second comet (1871), by M. Schulhof of Paris; and Tuttle's comet, due in the year 1885, by Mr. Ormond Stone of Cincinnati. The exceptional case of Biela's comet is not provided for.

THE GREAT SOUTHERN COMET OF 1880.—Dr. M. W. Meyer, of Geneva, assuming for the period of revolution of this comet the interval between the perihelion passage of the great comet of 1843 and that of the comet in 1880, corresponding to a semi-axis major of 11'0869, has adapted the other elements of the orbit thereto by means of Dr. B. A. Gould's observations at Cordoba on February 6, 12, and 19, covering an interval which, so far as we know at present, is only one day less than the whole extent of accurate observation: the Cordoba observations of February 5 await the meridional observation of the comparison star, which is not found in our catalogues: it may be well determined at one of the observatories of Southern Europe. Dr. Meyer's results are as follows:—

Perihelion passage, 1880, January 27'44242 G.M.T.

Longitude of perihelion ...	278 22 47	Mean equinox,
" ascending node ...	356 16 43	1880'0
Inclination of the orbit ...	36 52 13	
Log. excentricity (=log. sine ϕ)	9'9997682	or $\phi = 88^\circ 7' 41'' 55$
Log. perihelion distance ...	7'7720095	
Motion retrograde.		

The aphelion distance in this orbit is 22'1679 (the earth's mean distance being taken as unity), and at aphelion the comet is distant from the orbit of Uranus 13'15. The nearest approach to the orbit of Jupiter, about 3'1, takes place when the true anomaly is about 176° 35'. The comet's orbital velocity at perihelion is 338 miles in a second, and that at aphelion 477 feet in the same interval.

MINIMA OF ALGOL.—The following times of geocentric minima of Algol, observable in this country during the ensuing quarter, are deduced from the elements given by Prof. Schönfeld in his catalogue of 1875. Considerable perturbations of epoch appear to have taken place during the last five years, as we have previously noted in this column, and from the course of the errors of calculation it seems quite possible that the computed times may be nearly a half-hour too late. Systematic observations of this variable are now much to be desired, and it may be hoped that one or more of the many zealous amateur-astronomers here will devote attention to it. The perturbations to which we have alluded were particularly evident in 1876, and the error of the calculated times attained a maximum in the following year, a mean of seven observations by Prof. Julius Schmidt at Athens showing that the computed epoch was too late by forty-eight minutes. The following epochs are directly comparable with observation:—

	h. m.		h. m.
July 16 ...	12 39'0 G.M.T.	Aug. 25 ...	12 47'9 G.M.T.
19 ...	9 27'5 "	28 ...	9 36'4 "
Aug. 2 ...	14 19'6 "	Sept. 14 ...	14 27'7 "
5 ...	11 8'2 "	17 ...	11 16'2 "
22 ...	15 59'4 "	20 ...	8 4'8 "

PHYSICAL NOTES

ACCORDING to our contemporary *l'Électricité*, M. Exner of Vienna has discovered that a bismuth-antimony pair immersed in a gas incapable of acting chemically on either of these metals yields no current when one junction is heated. Also that if two bars of copper are soldered together to form a "pair" no current is produced when either junction is heated in air (as would be expected in a circuit of one metal), not even when both strips are exposed to the action of chlorine; but that if one strip only is exposed to chlorine gas and then one junction be warmed a thermo-electric current is set up. According to Exner therefore, all so-called thermo-electric currents are due to chemical action. It would be easy for some of our ardent young physicists to put to the test this very remarkable announcement, and see whether

it is Herr Exner, or all the authorities on thermo-electricity from Seebeck to Tait, on whom we are to rely for the facts.

IN a new capillary electrometer described by M. Debrun in the *Journal de Physique* (May), the microscope is dispensed with, and the requisite sensibility obtained by inclining the tube, which is slightly conical. The capillary tube is bent into a somewhat zig-zag shape, the two turned-up ends opening into larger tubes, and with the mercury in these wires are connected. The support can be turned in a vertical plane, so as to give the middle part of the capillary tube any desired inclination.

M. CROVA commends, for photometric purposes (*Journal de Physique*, May), M. Prazmowski's polariser, which is a Nicol, with faces normal to the axis of the prism, the two halves of which are joined with linseed oil. It requires large pieces of spar, and the joining is long and difficult, but there are several advantages. Thus the layer of oil (unlike Canada balsam), causes hardly any loss of light; its index, 1.485, being nearly equal to the extraordinary index of spar, the polarised field is limited on one side, as in Nicols, where the total reflection of the ordinary ray commences, by a red band; but these cond limit, corresponding to total reflection of the extraordinary ray, is thrown out of the field of vision; the angular value of the polarised field is thus increased. The increase of field, the angular separation of the only coloured band, and the direction of its bases, normal to the axis, are qualities to be appreciated in certain cases.

ACCORDING to some recent experiments of M. Goulier, the coefficient of expansion by heat of a metal is independent of any pressure put upon the metal, and is the same under a stress of traction as under one of compression.

MR. W. P. JOHNSON gives an account in the *Philosophical Magazine* of a new use of the telephone. It is sometimes necessary to grapple and lift a faulty cable, and if it lies in the water along with other cables of similar exterior make it has hitherto been impossible to decide, without cutting it apart, on the identity of the grappled portion. To avoid the obvious evil of having to cut and splice the cable unnecessarily, it is now suggested to employ the telephone on an auxiliary parallel wire in which the induction may be sufficiently strong to enable the electricians in charge to read the signals which may be sent into the cable, and so identify it.

THE following pretty experiment, devised by Mr. R. H. Ridout, illustrates the surface tension of mercury. A shallow tray, six inches by three, is supported on three levelling screws, and inclined just so that the mercury does not flow over the lipped edge. If now a small quantity of the liquid be set flowing over the edge it will draw the rest of the liquid over with a siphon-like action. It is difficult, however, to get the surface so clean that no adherent trail should be left, marring the completion of the experiment.

THE expansion of glass by heat may be demonstrated as follows:—A glass tube of narrow bore and about eighteen inches long is bent round in the shape of a horse-shoe, so that the free ends are within a millimetre of one another. Between these ends a coin may be held, being nipped between the ends of the rod and held there by the grasp due to the elasticity of the glass. If now the outer portion of the curved part be warmed, the ends open slightly and the coin drops out. This experiment is also due to the ingenuity of Mr. Ridout.

THE phenomenon lately discovered by Hall of the action of a magnet in altering the path of a current of electricity in the conductor which carries it, has formed the starting-point for two investigations, which have appeared separately in the *Wiener Anzeiger*, by Boltzmann and von Ettingshausen respectively, in which they point out that this discovery may be applied to determine the absolute velocity of electricity in a conductor.

M. LOUGHININ has published in the last fascicule of the *Journal of the Russian Physical and Chemical Society* (vol. xii., fasc. 4) a note on his important work on the heat which results from the burning of several alcohols. The substances experimented on are burnt in a jet of oxygen in a glass vessel which is placed in the water of a calorimeter. The figures are: For normal propylic alcohol, 481.6 calories for one molecule; isopropylic alcohol, 479 calories; isobutylic alcohol, 638.6 calories.

GEOGRAPHICAL NOTES

MR. CARL BOCK has lately returned to London after his journeys in Borneo, bringing with him a magnificent series of

portraits of the native tribes of that island,—both Dyaks and forest people—taken in water colours. These, we understand, are to be reproduced, at the expense of the Dutch Government, by chromolithography, and will illustrate his report on the journey, which is to be read in the first instance before the Royal Geographical and Anthropological Society of Holland. Pending the publication of this report, Mr. Bock refrains, at the desire of the Dutch Government, from anticipating it in England even by a preliminary sketch. The varieties of type, the methods of adornment, the manner, and to some extent the religion of these distinct races, are all brought out in Mr. Bock's faithful drawings taken from the life on the spot, which form, over and above the objects for which the journey was taken, a splendid contribution to ethnography, the publication of which will be looked forward to with interest; the greater perhaps if Mr. Bock were permitted to give some further slight outline than has already appeared in the pages of *NATURE*. Mr. Bock has also made an extensive collection of the swords, lances, blowing tubes, and shields (some of the latter covered with human hair), which are used by the natives. He seems to have had the happy knack of making friends of the savages whom others have found murderers, and has brought himself back alive to receive the honour that is his due.

THE current number of the Geographical Society's *Proceedings* opens with the Rev. C. Maples' very interesting paper on Masasi and the Rovuma district between Lake Nyassa and the east coast of Africa. The Rev. C. T. Wilson's and Mr. Felkin's brief notes on Uganda and the journey through the Nile region are also published, and are followed by an account of that rare occurrence in Dominica, a volcanic eruption at the Grand Soufrière, which took place on January 4. The geographical notes include a list of latitudes in Central South Africa, Mr. F. C. Selous' explorations on the Zambesi, &c. (of which full accounts are to be published in a later number), and a journey in Damara-land and beyond the River Okavango. An allusion is also made to Mr. Whympers' ascent of Cotopaxi, and to a proposed exploration of some of the unknown affluents of the Purús. Among the remaining notes is a long account of the country of the Mijjertain Somalis, and of recent exploration in Central Australia. Col. H. Yule furnishes an obituary notice of General Macleod, whose pioneer journey into the interior of the Indo-Chinese Peninsula in 1836-7 is, we fear, now almost forgotten. The map this month is that of the central portion of South Africa, illustrating Dr. Emil Holub's journeys, and constructed in part from his original drawings.

DR. EMIL BESSELS, who was with Hall in the *Polaris*, hopes to undertake a new Arctic expedition in 1881 on funds subscribed in America. He will establish a station at the entrance of Jones Sound, where a scientific staff will be located, consisting of an astronomer, a physicist, a geologist, botanist, and zoologist. Intercourse will be kept up with the settlement of North Greenland by means of a yacht, as well as with the whalers.

SIGNOR CRISTOFORO NEGRI, President of the Italian Geographical Society, and member of the Geographical Society of London, has just published an interesting pamphlet at Genoa, in which he warmly advocates the proposed Italian Antarctic expedition. He demonstrates the importance not only to science, but probably also to trade, of such an expedition. A special circumstance increases the desirability of this Italian Antarctic expedition. In 1882 the transit of Venus will again occur, but after that not again for a hundred years. The Italian expedition, therefore, finding itself in 1882 at some point of the Antarctic circle, would be able to observe this phenomenon under favourable conditions. Signor Negri believes that the expedition might be made with a single vessel at no very extravagant cost, perhaps 600,000 to 700,000 Italian lire. It would spend two winters, returning to La Plata, if necessary, during that period, to re-provision and re-coal the ship.

AT the last meeting of the Russian Geographical Society the Secretary intimated that M. Potanin continues his exploration of North-Western Mongolia. The Society has just received from him a part of his collections, and expects soon to receive his detailed report. M. Tiaghin, who stays on Novaya Zemlya for the exploration of that island, has brought together a very good collection of plants, and has made interesting communications as to the geography of the island. As to new expeditions, the Society proposes to send M. Mereshkovsky to the Crimea for ethnographical and archæological explorations, and M. Malakhoff to the Middle Ural Mountains for zoo-geographical investiga-